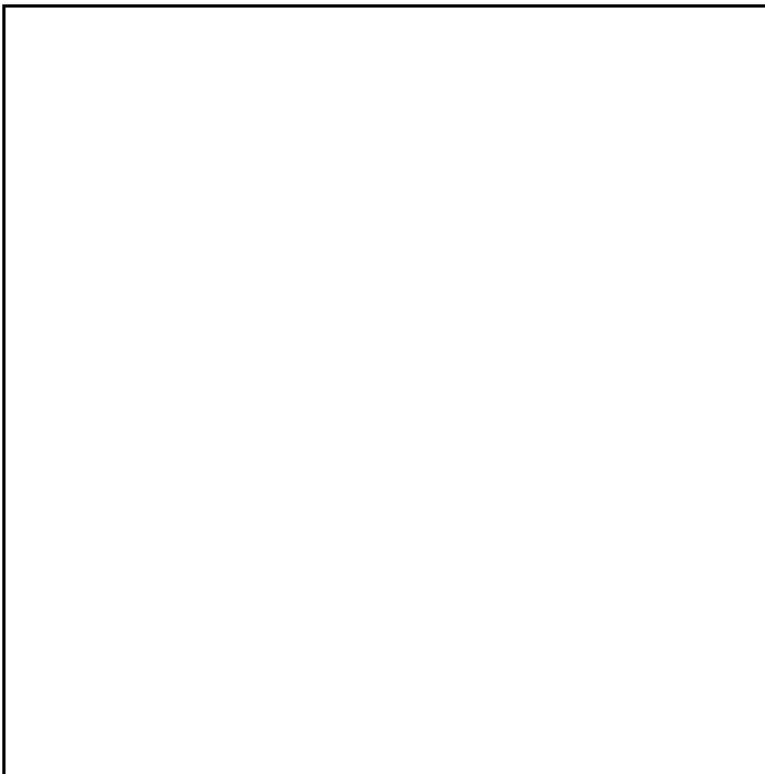


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OPERATION MANUAL

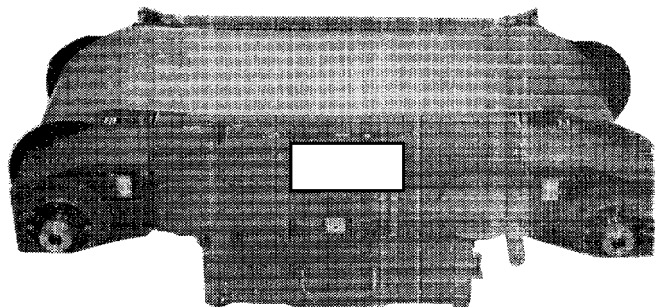
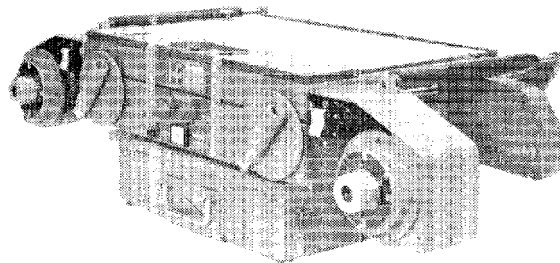
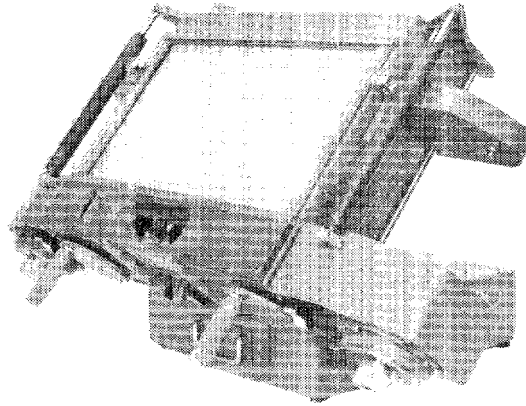
ADVANCED LIGHT TABLE PROTOTYPE

SERIAL NO. 100

April 1969



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Figure 1-1.

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SECTION 1

INTRODUCTION AND DESCRIPTION

1.1 IDENTIFICATION

STAT This publication is the basic manual of operation for the
[redacted] Advanced Light Table Prototype. The unit was
engineered and manufactured by the [redacted]

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STAT [redacted] It is illustrated in Figures 1-1,
The maintenance manual and illustrated parts list is bound as a separate
document.

1.2 PURPOSE OF EQUIPMENT

The Advanced Light Table will accommodate single spools of
70mm, 5 inch, 6.6 inch or 9-1/2 inch wide film in rolls up to 500 feet.
Film can be transported by power or manually across the light box surface
in either direction. Film travel speed is adjustable from rapid slewing
speed for rewinding to slow scanning speed for photointerpretation
reviewing. The table can be operated horizontally or tilted, up to
75 degrees, toward the operator. It can also be rotated CCW 90 degrees
and operated horizontally or tilted.

The table has been designed for reasonable portability allowing
easy transportation between locations.

1.3 LEADING PARTICULARS

Significant characteristics are listed in Table 1-1.

TABLE 1-1
LEADING PARTICULARS

Film Capacity	Supply and takeup bracket accommodate spools in widths from 70mm through 9-1/2 in. in lengths up to 500 ft (standard base).
Film Winding Direction	Film may be wound emulsion in or out by reversing spool direction with the film loading controls.
Transport Speed and Direction	Continuously variable from 0 to 250 fpm in both directions with the speed and direction control knob on top panel of viewing assembly.
Transport Control and Drive	Solid state DC controlled direct drive torque motors which provide torque in either direction for driving or applying film tension.
Transport Drive (Manual)	Three handwheel cranks, two along front and one at left rear. Coupled to spool drives through electric clutches.

TABLE 1-1 (Cont'd)
LEADING PARTICULARS

Film Drive Changeover (Manual to Power)	Operator actuated manual/power switch automatically disengaging electrical clutches. Top panel of viewing assembly.
Film Tension	Reverse torque applied to motors. Maintained regardless of speed or direction change through manual or power. Tension control provided on front panel of viewing assembly.
Film Tracking	Standoff rollers and spool bracket spindle assemblies adjustable to compensate for film variations.
Table Tilting	Tilting of up to 75 degrees from horizontal (motorized). Drive System with switch on base assembly.
Table Rotation	90 degrees CCW rotation while horizontal or at any tilt angle. (Manually operated.)
Film Viewing Area	9-1/2 in. wide by 18 in. long.

TABLE 1-1 (Cont'd)
LEADING PARTICULARS

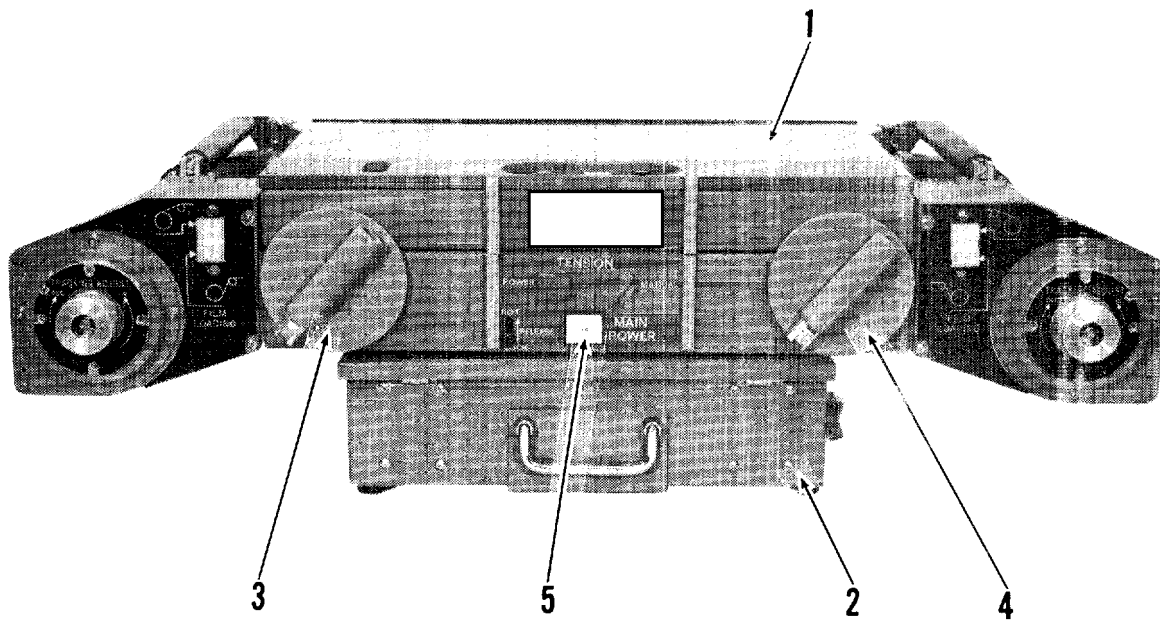
Viewing Light Source	Diffused cold cathode light grid. Intensity variable from approximately 2300 to 10 ft-lamberts. Light uniformity is within 10%.
Light Masking	Adjustable shade provided for film widths 9-1/2 through 70mm.
Weight	120 lbs approximately.
Operational Noise Level	Static operation (light on and film tension applied); no perceptable noise above ambient. Dynamic operation: Above Ambient, "C" Weighted Scale 2 db Above Ambient, "A" Weighted Scale 10 db
Electrical Requirements	117 volts (+10V, -15V), 60 cycle AC power source, 15 amps
Overall Dimensions	Length: 36-1/2 inches Width: 19-1/2 inches Height: 10-3/4 inches (Table Top - Horizontal)
Handcrank and Adapter	For manual operation in case of power failure.

1.4 DESCRIPTION

The table is basically constructed in two portions, a viewing assembly which is supported on a base assembly (Figure 1-2). The viewing assembly includes film transport mechanisms, light viewing area and operating controls. This assembly can be tilted and rotated by the operator. (Tilting is electro/mechanical, rotation is accomplished manually.) The base assembly houses the tilting mechanism with its motor drive, electrical components and the light grid power transformers.

Film can be scanned or slewed in any tilt position. It can be wound emulsion in or out on the spools.

Manual operation is provided by three handwheels (see Figure 1-3) to allow film winding convenience in either of the two positions of table rotation. The direction of film movement corresponds to the direction of rotation of the handwheels.



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Figure 1-2. Advance Light Table, Front View

Key to Figure 1-2

1. Viewing Assembly
2. Base Assembly
3. Manual Handwheel
4. Manual Handwheel
5. Main Power Switch

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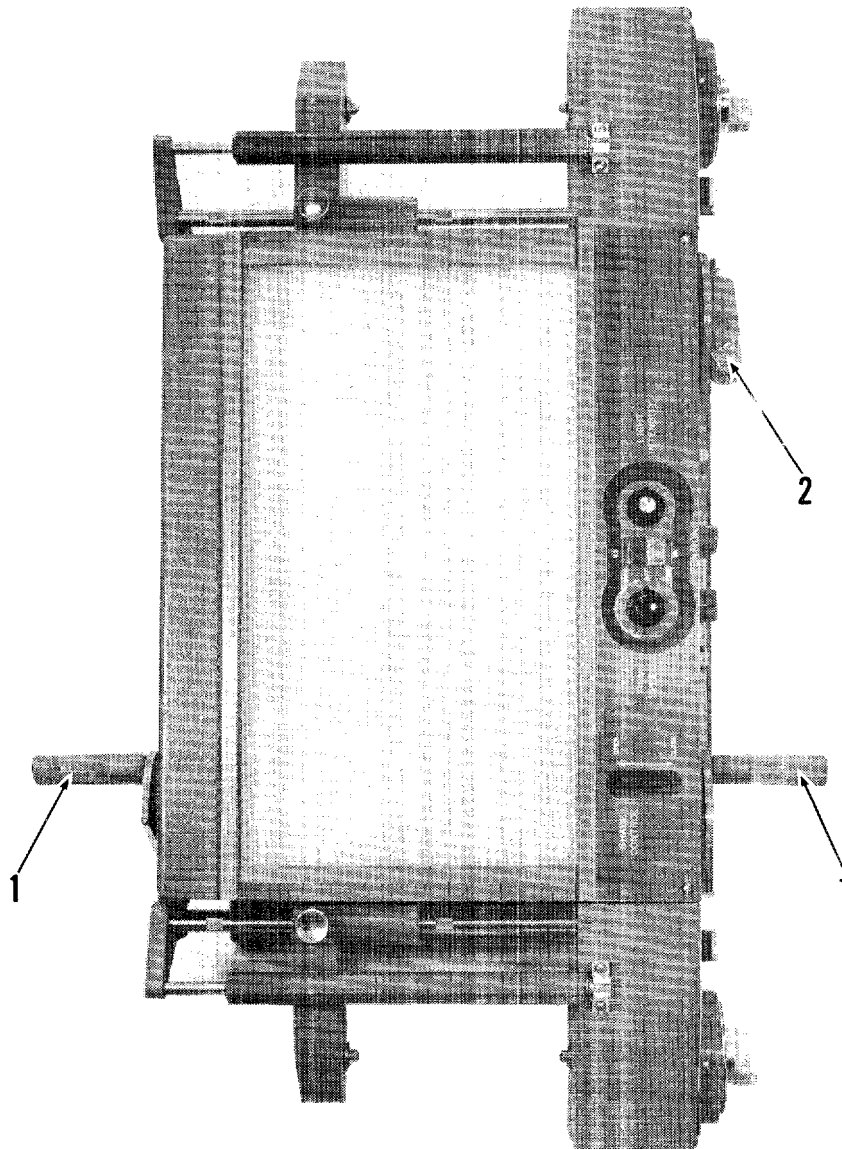


Figure 1-3. Advance Light Table, Rotated 90 Degrees & Tilted

Key to Figure 1-3

1. Manual Handwheel (Extended)
2. Manual Handwheel (Retracted)

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SECTION 2

PREPARATION FOR USE

2.1 INSTALLATION

The table is designed for use in daylight or darkroom. Initial conditions for installation include properly rated power and support furniture. The light table must be installed on the forward edge of supporting table top for operational clearance.

Upon receipt of the film viewing table:

INSPECT FOR BROKEN OR DAMAGED PARTS
REMOVE ANY PARTS, SUCH AS ROLLERS,
GLASS, ETC., FROM PROTECTIVE
CONTAINERS
MOUNT AND ALIGN (REALIGN) ANY
NECESSARY PARTS
CHECK FUSE (15 AMP)
CONNECT POWER

2.2 POWER REQUIREMENTS

The Advanced Light Table is designed to operate on 117V (+10V, -15V), 60 cycle, single-phase power. Circuits are protected by a 15 amp fuse. The power plug has two AC contacts and a ground contact and may be inserted into any convenient grounded power receptacle.

2.3 OPERATIONAL CHECKS

At the completion of installation, it is recommended that the following operational checks are made to determine if the unit is functioning properly. Refer to Section 3 for applicable operating procedures. If performance is not as specified, refer to the troubleshooting information in Section 1 of the maintenance manual to correct deficiencies.

(See Figure 3-1)

- 1) Power switch ON.
- 2) Light intensity knob turned up. Light should come on.
- 3) Rotate light intensity knob. Light intensity should vary.
- 4) Rotate knurled SHADE wheel. Shade mask should move across underside of glass viewing surface toward the operator.
- 5) Depress TILT switch. Table should tilt up to 75 degrees or to any intermediate position and stop when switch is released. Lower table by depressing switch in down position.
- 6) Raise manual rotation lock lever. Table can be rotated CCW 90 degrees and locked by depressing manual lock lever.
- 7) Load table with film. Set film loading switches to position corresponding to way film is wound on spool. Put MANUAL/POWER switch in power position. Transport film from supply to takeup reel and back to supply reel with FILM SPEED AND DIRECTION control. Adjust FILM TENSION control as required. Check entire speed range through both directions. Standoff film rollers should prevent film contact with light table surface.

Adjust tracking knobs to provide proper tracking as necessary. Change to manual drive by placing MANUAL/POWER switch in manual position. Adjust manual tension knob as required. Rotate table 90 degrees CCW and repeat above. Tilt table and repeat.

- 8) Repeat 7 with three other film sizes. Film transport system should work equally well with all four sizes of film.
- 9) Load all size film spools wound in the opposite direction and repeat 7 after setting FILM LOADING CONTROL switches. Film transport should work equally well in this configuration.

SECTION 3

OPERATING INSTRUCTIONS

3.1 OPERATING CONTROLS

Operating controls and their functions are listed in Table 3-1 and their locations are shown in Figures 1-2 and 3-1.

3.2 PRELIMINARY PREPARATION CONDITIONS

After preparation for use (initial unpacking and setup) preliminary conditions should be established as follows:

- 1) Ensure that all switches are off and operating controls set at neutral or minimum positions.
- 2) Clean glass, rollers and table top surfaces as follows.
(See Section 1 of Maintenance Manual.)

3.3 MAIN POWER SWITCH

Push switch for power "ON." Switch will illuminate when power is on.

3.4 FILM SPOOL INSTALLATION (FIGURE 3-1)

To install film spools proceed as follows:

- 1) Check film tension control for OFF mode.
- 2) Check film direction/speed control for neutral position.
- 3) Set film loading control to desired position for the loading and unloading of film spools. See paragraph 3.10.
- 4) Turn tracking adjustment knob full counterclockwise.

- 5) Release lock detent on rear (movable) film spool carriage.

CAUTION

Carriage is spring loaded.

- 6) While holding carriage install film spool. Allow carriage spindle to engage spool and rotate lock into detented position. (Red indicator to show "unlocked" position will disappear.) Rotate spool to engage key on drive spindle.
- 7) Thread leader onto takeup spool.

NOTE

Supply can be mounted
on left or right side.

To remove film spool:

- 1) Turn tracking adjustment knob full counterclockwise.
- 2) Release lock detent on carriage.
- 3) Hold spool and move carriage away from spool to release.
- 4) Move carriage to desired position and lock detent.

CAUTION

Carriage is spring loaded.

3.5 FILM TENSION CONTROL (FIGURE 3-5)

The tension control has three positions: Power (Pwr), Manual (Man), and Off. It selects the three modes of operation: Power drive, manual drive, and off. Tension is maintained on the film at any transport speed whether manual or power, by reverse torque applied to the film spool drive opposite to the side being driven.

NOTE

Do not operate tension control while film is moving. Before changing film tension control positions, set speed/direction control to neutral.

Tension can be varied as required by the tension adjustment knobs (Figure 3-1). These knobs, by rotation, control the tension in the power or manual mode. CW rotation increases tension and CCW rotation decreases tension.

3.6 FILM TRANSPORT DIRECTION AND SPEED CONTROL (FIGURE 3-1)

Direction of film travel (left or right) is selected by rotating the film transport speed and direction control knob CCW or CW respectively. In the center position of this control knob the transport system is at rest. Film speed is controlled by the degree of knob rotation.

3.7 FILM TRANSPORT (FIGURE 3-1)

3.7.1 Power Drive Mode

- 1) Check film loading control for position corresponding to way film is wound on spools. Control on side with empty spool may be set to wind under or over as desired. See para. 3.10.
- 2) Select PWR position on tension control (top panel).
- 3) Set power tension adjustment to desired tension (front panel).

NOTE

Only enough tension
should be set to hold
the film off of the glass
viewing surface.

- 4) Rotate direction/speed control CCW or CW for left or right film travel and desired speed.

NOTE

Speed varies from
0 to 250 ft/min.

- 5) Reverse film direction by turning direction/speed control opposite to original position selected.
- 6) Stop film travel by neutralizing direction/speed control.

3.7.2 Manual Drive Mode

- 1) Check film loading controls as described in 3.7.1 (1).
- 2) Select MAN. position on tension control (top panel).
- 3) Set manual tension adjustment to desired tension (front panel).

NOTE

Only enough tension
should be set to hold
the film off of the glass
viewing surface.

- 4) Transport film by rotating any one of three manual handwheels. Change in film direction may be made by changing rotational direction of handwheels.

When manually transporting the film, the tension set in with the manual tension adjustment opposes the operator effort thus making it difficult to manually transport at high tension settings. As film is transported from one spool to the other it will become more difficult to manually transport the film towards the spool with the largest diameter of film. To offset this condition the direction/speed control (used in the power mode) will proportion the tension input to the left and right spool drives. It may be turned towards the large diameter spool in order to balance the force required for manual cranking. The direction/speed control would be centered when both spools were of approximately equal diameter.

NOTE

Reengaging the power mode by actuating the tension control automatically disengages the clutches freeing the handwheels from the drive system and allowing the operator to immediately proceed to power drive operation. When selecting manual mode, from power mode, the driving clutches on the reel drive that is winding the film are automatically actuated by a direction sensing switch. Manually reversing direction will automatically actuate the opposite drive clutches.

3.7.3 "OFF" Mode (Manual Operation)

- 1) Select OFF position on film tension control.
- 2) Transport film by rotating any one of the three manual handwheels.

In this mode there will be no film tension. This mode may be used for manual rapid rewind and installation or removal of film spools.

3.8 MANUAL FILM DRIVE IN EVENT OF POWER FAILURE (FIGURE 3-1)

In the event of a power failure, a handcrank will be used to wind and unwind the film. The crank is inserted through the tracking knob and engages the square end of the spool drive spindle. Rotating the crank on the desired drive spindle will rotate the film spool.

3.9 FILM TRACKING ADJUSTMENTS (FIGURE 3-1)

Both the standoff rollers (positioned to keep the film above the light table surface without its touching the glass (Figure 3-1) and the spool bracket assemblies are factory adjusted to assure proper film tracking under various conditions of operation. Micro-adjustment is provided on the standoff rollers for vertical and horizontal fine positioning.

To adjust tracking:

- 1) Standoff roller micro-adjustment. By loosening the two screws holding the roller bracket on the fixed drive housing the bracket may be shifted until the roller is square with the film spool axis. The roller shaft may be moved up or down by adjusting the set screw provided in the roller bracket to maintain parallelism with the film spool axis. After adjustment, tighten the locking set screw (at right angles to the adjusting set screw) against the adjustment set screw.
- 2) To compensate for long edged (fluted) film, each film spool can be moved axially approximately 3/16 inch. This is accomplished by turning the tracking knobs on the fixed drive housings (Figure 3-1). CW rotation will move the film out (away from the operator). CCW rotation will move the film in (toward the operator).

3.10 FILM LOADING CONTROL (FIGURE 3-1)

These controls are located on the front film spool drive housings.

They are provided to allow rotation of film spools in either direction regardless of film transport direction. This allows the accommodation of film wound either emulsion out or in. Table 3-2 shows possible threading schemes for the film transport system.

The control switch (Figure 3-1) is actuated according to the instruction decal to control the direction of spool rotation.

3.11 TILT CONTROLS (FIGURE 3-1)

The viewing assembly can be tilted from the base assembly toward the operator to any angle from the horizontal up to 75 degrees. Tilting can be accomplished in either the long or short axis. (The short axis refers to the viewing assembly rotated as described in Section 3.12.)

To tilt the table, depress the spring loaded 3-position tilt switch (Figure 3-1) in the "up" position maintaining pressure until the desired angle is reached. Removing pressure from the switch stops the tilt at any angle desired, up to 75 degrees. Overtravel of the tilt is prevented by mechanical stops and a slip clutch. Ratcheting of the slip clutch will be noticed when reaching the full "up" or full "down" position. When the tilting motor is de-energized, the assembly will remain at the selected angle without the use of a locking device.

To lower the assembly, reengage the tilt switch in the "down" position.

3.12 VIEWING ASSEMBLY ROTATION CONTROL (FIGURE 3-1)

The viewing assembly is attached by rotating rings to the tilt plate in such a location that the film spools and transport mechanism will clear the base assembly when the viewing assembly is rotated. The assembly can be rotated 90 degrees and is designed so that the forward working edge is aligned with the front edge of the base assembly in the long and short axis positions.

To rotate the upper assembly, disengage the rotation lock pin by lifting up lever (Figure 3-1) and manually rotate the assembly. The lock pin will securely lock the assembly to the tilt plate at 90 degrees to its original position by pushing down on the rotation lock lever.

3.13 LIGHT CONTROLS (FIGURE 3-1)

A rotating knob is provided for varying the viewing light intensity.

After applying power to the viewing light, the knob is rotated clockwise to increase and counterclockwise to decrease the illumination intensity. The intensity is variable from approximately 10 to 2300 ft-lamberts. Rotating the light intensity control knob fully CCW turns off the light.

3.14 ADJUSTABLE SHADE (FIGURE 3-1)

When reviewing film of less than 9-1/2 in. width a variable shade can be introduced across the width of the table from the top down toward the operator. This black shade will mask off the light where desired.

To introduce the shade, turn the recessed knurled wheel (Figure 3-1) on the left top of the table adjacent to the viewing area.

The shade will operate properly in any tilted position.

3.15 MANUAL TILT OPERATION

In event of an electrical failure the tilt mechanism may be operated by removing the access plug in the right hand side of the base and inserting the manual handcrank, with adapter, onto the tilt motor shaft.

TABLE 3-1
OPERATING CONTROLS

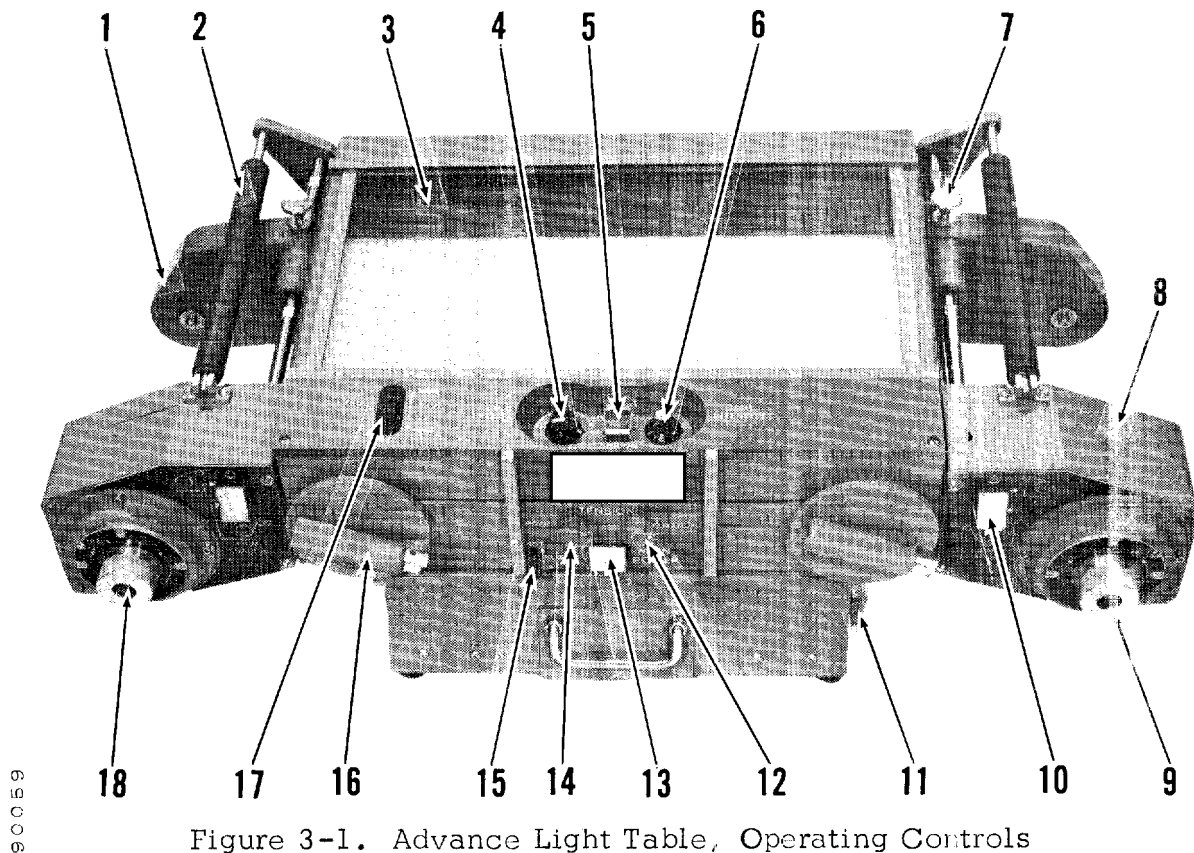
<u>Figure Reference</u>	<u>Control</u>	<u>Type and Function</u>
3-1 (13)	Power Switch	Illuminated pushbutton to apply power to the table. Light is energized when switch is "ON".
3-1 (6)	Light Intensity Control	Rotational knob to vary light intensity.
3-1 (5)	Film Tension Control	3-position switch for selecting power or manual mode film transport or "OFF".
3-1 (4)	Film Direction and Speed Control	Rotational knob to select film direction and speed for 0-250 ft/min.
3-1 (11)	Tilt Switch	Spring loaded 3-position switch which depressed raises the viewing assembly to a maximum of 75 degrees or any intermediate position.
3-1 (15)	Rotation Lock	Locking lever which allows manual rotation of the viewing assembly CCW 90 degrees and locks it.

TABLE 3-1 (Cont'd)
OPERATING CONTROLS

<u>Figure Reference</u>	<u>Control</u>	<u>Type and Function</u>
3-1 (9)	Tracking Adjustment Knob	Rotational movement allowing adjustment for proper tracking of all film sizes at all speeds.
3-1 (16)	Film Drive (Manual)	Handwheels to manually transport film in either direction.
3-1 (17)	Shade Mask Adjustment	Knurled knob to adjust mask to desired film size. Adjusts toward the operator.
	Fuse	15 amp fuse located left-rear of base assembly.
3-1 (10)	Film Loading Control	Rocker type switch to reverse direction of film spool rotation allowing film emulsion to be wound in or out as desired.
3-1 (7)	Film Carriage Release Detent Lock	Spring loaded detent knob which pulls out and rotates for loading and unloading film spools. Rotates in and locks for transport operation.

TABLE 3-1 (Cont'd)
OPERATING CONTROLS

<u>Figure Reference</u>	<u>Control</u>	<u>Type and Function</u>
3-1 (14)	Power Tension Adjustment	Rotational knob adjusts tension in power transport mode.
3-1 (12)	Manual Tension Adjustment	Rotational knob adjusts tension in manual transport mode.
3-1 (18)	Emergency Manual Film Drive	Handcrank attachment for manual film drive in case of complete electrical power failure.
	Emergency Manual tilt drive	Handcrank and adapter for manual actuation of tilt mechanism in case of electrical failure.



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Figure 3-1. Advance Light Table, Operating Controls

Key to Figure 3-1

1. Movable Film Carriage
2. Film Rollers
3. Shade
4. Film Direction and Speed Control
5. Film Tension Control
6. Light Intensity Control
7. Carriage Lock Detent
8. Fixed Motor Drive Housing
9. Tracking Adjustment Knob
10. Film Loading Control
11. Tilt Control
12. Tension Adjustment Knob for Manual Mode
13. Main Power Switch
14. Tension Adjustment Knob for Power Mode
15. Rotation Lock Lever
16. Manual Handwheel
17. Shade Control Wheel
18. Manual Film Drive Connection for Handcrank

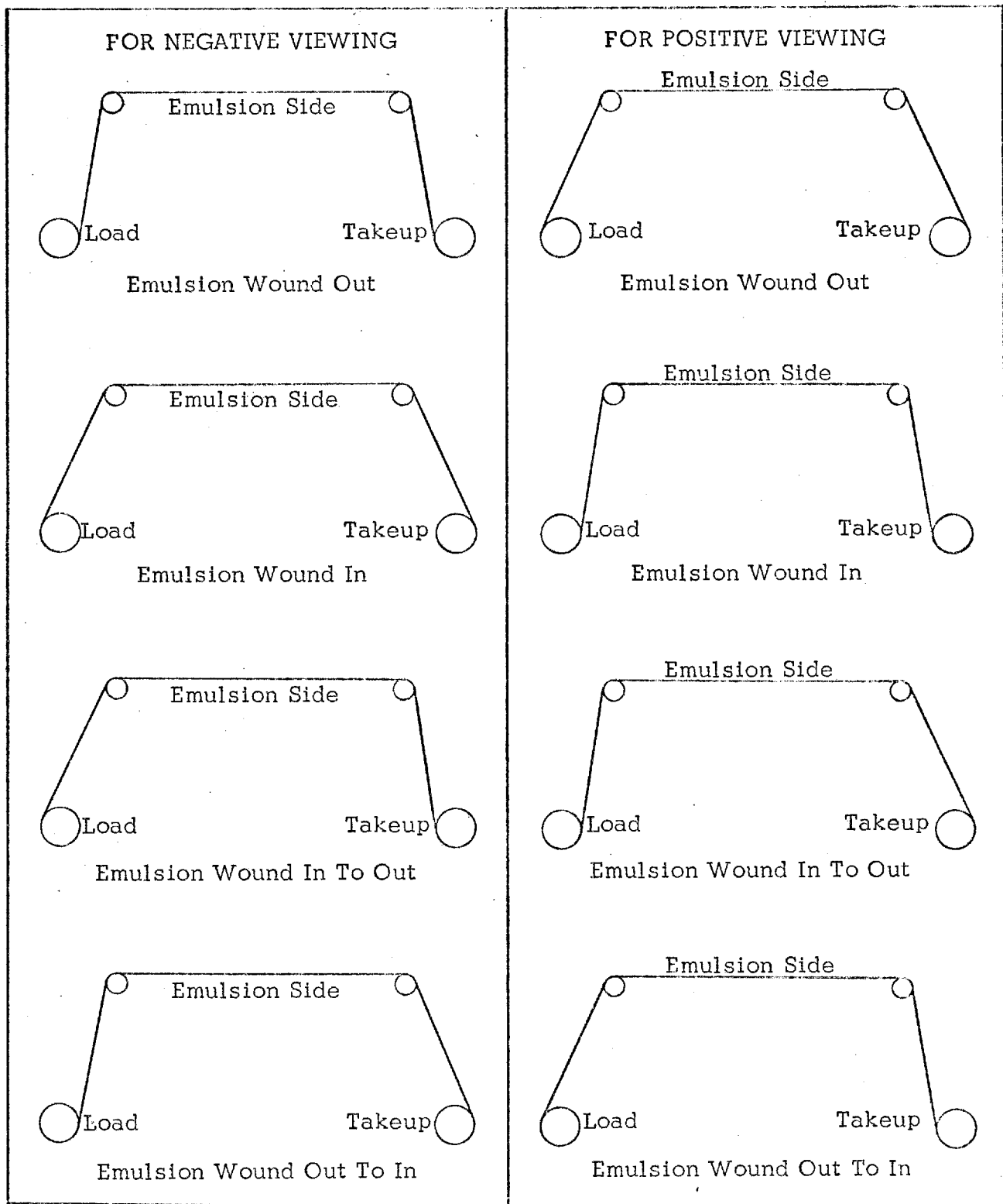


Figure 3-2. Film Loading Diagram

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